Remarks/Arguments

Reconsideration of this application is requested. Claims 1-8 are in the case.

Rejection under 35 USC 112, Second Paragraph

Claims 1-8 have been rejected under 35 USC 112, second paragraph, as being indefinite. Claim 1 was seen as having improper hybrid claim language beginning with the recitation of "wherein a dried coating of the blend on a substrate."

Response to 35 USC 112 rejection

The preamble of claim 1 has been amended to recite the use of the blend for a barrier coating which provides a hydrostatic head barrier sufficient to prevent passage of aqueous fluids but allow passage of water vapor through it. Support for claim 1 can be found at page 3, lines 1-14. It is believed that the amendment to claim 1 overcomes the rejection under 35 USC 112, second paragraph.

Rejection under 35 USC 103(a)

Claims 1-8 have been rejected under 35 USC 103(a) as being obvious over GB 876,226 in view of Mao et al. (EP 0 841 351 A2).

GB 876,226 was cited as teaching a wax-resin emulsion composition which when coated on paper exhibits excellent waterproofing, block resistance, and grease-proofing properties, and is suitable for coating fibrous substrates such as paper, paperboard, and textiles. The GB document was seen as failing to teach the claimed polymer emulsion; however, Mao et al. was sited as teaching an adhesive composition comprising the claimed polymer emulsion. It was argued, *inter alia*, that it would have been obvious to formulate the wax-resin emulsion coating composition of GB 876,226 with the polymer emulsion disclosed by Mao et al., motivated by the desire to provide a coating composition with excellent bond, peel, cohesive strength and stability.

Response to rejection under 35 USC 103(a)

The blend of this invention (claims 1-8) is used for barrier coatings which have a hydrostatic head which prevents passage of aqueous fluids but allow passage of water vapor through the coating. Neither of the references alone or in combination would have made the coating formulation of claims 1-8 *prima facie* obvious.

GB 876,266 discloses a blend of a wax emulsion with a plasticized polyvinyl acetate resin or a plasticized vinyl acetate copolymer emulsion, for use as a coating on fibrous materials to achieve grease resistance and water resistance. A coating of the blend is reported to be block resistant, greaseproof, waterproof, and flexible (page 1, lines 70-73). However, GB 876,266 does not disclose or suggest that the coating prevents water penetration but allows penetration of water vapor, and it does not disclose the polymer emulsion as recited in claims 1-8 of this invention.

Mao et al. disclose a polymer emulsion for use in pressure sensitive adhesive applications. Pressure sensitive adhesives are permanently tacky at room temperature and thus display blocking properties. See enclosed copies of pages from the *Encyclopedia of Polymer Science and Engineering*, 2d edition, Wiley-Interscience, 1985-1987, which describes pressure sensitive adhesives and blocking. Pressure sensitive adhesives exhibit blocking, i.e., the tendency of two adjacent layers of film to stick together. Since the wax-resin compositions disclosed in GB 876,266 are reported to be block resistant, it would not have been expected that combining the polymer emulsion of Mao et al. in the wax-resin composition disclosed by GB 876,266 would have produced a formulation which is block resistant. (See page 1, lines 21-26, where it is taught that the coating must be free of blocking, and page 2, lines 40-44, where it is taught that polyvinyl acetate copolymers are preferred for the resin because they enhance antiblocking properties) Since Mao et al. teach a pressure sensitive adhesive, the teaching is away from using it for a coating formulation which shows block resistance and thus is away from use of the pressure sensitive polymer emulsion in the wax-resin composition disclosed in GB 876,266. It is therefore submitted that it would not have been *prima facie* obvious to use the pressure sensitive polymer emulsion disclosed by Mao et al. in the wax-resin composition disclosed in GB 876,266. The rejection of claims 1-8 under 35 USC 103(a) as being obvious over GB 876,226 in view of Mao et al. (EP 0 841 351 A2) should be withdrawn.

In view of the amendments and arguments made herein, it is believed that the application is in condition for allowance and should be passed to issue.

Respectfully submitted,

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Enclosures: *Encyclopedia of Polymer Science and Engineering,* 2d ed., page 551 (Vol.1)
and page 83 (Vol.7); Wiley-Interscience, 1985-1987.

c: R. A. Borst/File

Polymerizing Types. This category of adhesive includes chemically reactive monomers or oligomers that polymerize to high-molecular-weight or network species after application. All thermosets are in this category. Most commonly, as in the case of epoxies, phenolics, and polyurethanes, the starting materials are liquid oligomers that are mixed with catalysts, curing agents, or coreactive additives. The resultant step-growth polymerization, which occurs after the joint is formed, yields very strong cross-linked adhesives. Adhesives developed from chain-growth polymerizations are increasingly important; cyanoacrylates, which remain thermoplastic, anaerobic acrylics, and toughened or reactive acrylics are examples of such adhesives (see 2-CYANOACRYLIC ESTER POLYMERS under ACRYLIC AND METHACRYLIC ESTER POLYMERS).

Shelf life and working time are important considerations with these adhesives. Greater shelf life is obtained with latent catalysts that require heating to effect cure in a reasonable time. For room-temperature curing systems, the curing agent must be mixed with the base resin just before application. With these two-component reactive adhesives, the two species are separated before use to provide good shelf life.

Radiation-curable Adhesives. These adhesives are reactive or polymerizing one-component types for which cure is initiated by uv or electron-beam radiation. Basically, these adhesives polymerize by free-radical mechanisms; a photosensitizer or photoinitiator is included in the formulation where uv is used. Similarly, induction heating can initiate polymerization, particularly for urea–formaldehyde and phenolic adhesives. Because of the rapidity with which cure can be effected, the use of radiation curing is expected to increase in the future (see CROSS-LINKING, WITH RADIATION).

Pressure-sensitive Adhesives. Unlike other adhesives, the pressure-sensitive adhesives do not change their physical state from the initial stage of adhesion, ie, application, to the final breaking of the adhesive bond; they remain permanently deformable, and may alter under even slight application of pressure. By definition, they are adhesives that in dry form are permanently tacky at room temperature and that firmly adhere to surfaces upon mere contact. By far the most common form of pressure-sensitive adhesive is on a backing, usually in tape form, and manual application of the tape is the predominant mode of use. Common masking tape, for example, is manually applied after the user removes the desired length from a roll. Many bandages are held to the skin by pressure-sensitive adhesives. In many industrial splicing and packaging operations, the tape is dispensed by machinery. The important pressure-sensitive adhesives are tackified elastomers, poly(alkyl acrylates), and silicones. The most widely used elastomers are natural rubber, ethylene–vinyl acetate copolymers, and styrenic thermoplastic elastomers (see PRESSURE-SENSITIVE ADHESIVES).

Adhesive Application Methods

...ng, the plasticizer melts, and the previously tack-... an adhesive.

...pplied from solvents to both substrates, which are ...ation of the solvent. It is probable that not all of ...overlong drying renders the coated substrates non-...t members of this group are based on mixtures of ...with oil-soluble phenolic resoles. The phenolic resin ...ermosetting agent so that the coated substrates ... each other under pressure. Heat often helps to

Many adhesives are formulated as emulsions. The ...ies, whether adhesives are prepared by true emul-...ed as larger particles. In addition to their economic ...ning 40–50% solids offer lower viscosity than so-...high molecular-weight polymers. Adhesives pre-...tion include acrylics, chloroprene, and poly(vinyl ...h as polyurethanes, epoxies, silicones, and some ...igh shear in the presence of surfactants to obtain ...alt in aqueous dispersion is used for bonding floor-...tion.

...lvent-activated adhesives are applied dry, and be-...wet with organic solvents just before the bonding ...al because of fire and health hazards. On the other ...es are very popular; the adhesives on various labels, ...tamps are water-activated. Commonly, these ad-...; and, less often, on animal glues and poly(vinyl

...ed, usually from solution, in the form of a nontacky ...s, and then activated, ie, liquefied, by heat. Such ...ber, vinyl formal polymers, phenoxies, cellulosics,

...naterials resemble both the hot melts and the heat-...echanism of bonding. Polymer in the shape of a ...antages: the bonding operation is simple and rapid, ...uniform and easily controlled, and the availability ...of an adhesive of different character for each of ...Epoxies, phenolics, nitrile elastomers (and blends ...poly(vinyl butyral), poly(vinyl chloride), and eth-...ers are all available in film form. The films, often ...ndling, can also be shaped or fabricated to match ...o be bonded. Many film adhesives are supplied in ...ight fabrics. Nylon, polyester, and glass mats are

...dhesives are similar in form to films. The webs of ...articularly useful for bonding flexible substrates

small hole in the sample. The most common test is the Elmendorf test (ASTM D 1922-61T) (9).

Transmission. It is one of the prime functions of a packaging film to act as a barrier to gases and vapors. Biscuits, for example, need to be kept dry, whereas cigarettes and tobacco need to be protected from moisture loss. Fresh produce must be able to lose carbon dioxide and absorb oxygen; on the other hand, fatty foods may turn rancid in the presence of oxygen. Many foods are packed in a vacuum, which requires a good barrier (see BARRIER POLYMERS). The method to measure water-vapor transmission rate (WVTR) is described in ASTM F 372 and the method for oxygen in ASTM D 3985 (9).

Haze. Haze is defined as the percentage of transmitted light that, in passing through a sample, deviates by more than 2.5° on average from an incident parallel beam by forward scattering from surfaces and from within the sample. The appearance of haze is caused by light being scattered by surface imperfections or inhomogeneities in the film. The latter can be caused by voids, large crystallites, incompletely dissolved additives, or cross-linked material (ASTM D 1003-61) (9).

Gloss. Gloss is a measure of the ability of the film to reflect incident light specularly. A high gloss produces a sharp image of any light source and gives a pleasing sparkle. Gloss is defined as the percentage of incident light that is reflected at an angle equal to the angle of incidence (usually 45°) (ASTM D 2457-70) (9).

Coefficient of Friction. The coefficient of friction (COF) is a measure of the ease with which the surface of one material slides over another. Thus, films that are slippery and move easily over various surfaces have a low COF. The value of the coefficient of dynamic friction is affected by the speed of movement of one surface over the other, humidity, temperature, and static electricity (ASTM D 1894-63) (9).

Blocking. A property related to friction is blocking, which is the tendency of two adjacent layers of film to stick together, particularly when under pressure, as when films are stacked in cut sheets or left on a roll. Blocking is particularly marked in films with smooth surfaces, which can come into intimate contact with each other with consequent exclusion of air. Other factors that affect blocking are static charges, surface treatment, and storage conditions. The degree of blocking is determined by the force required to separate the two layers of blocked film, when the force is applied perpendicularly to the surface of the film (ASTM D 1893-61T) (9).

Heat Sealability. The heat sealability of a packaging film and the integrity of the seal are of great importance in wrapping. Heat sealability of a film has to be considered in relation to the available pressure, dwell time, temperature, configuration (flat or crimped), and the rate of heat transfer of the sealing bars. The heat seal can be made by different methods. Its strength is determined by measuring the force required to pull the pieces apart. The force can be applied in such a way as to cause the seal to fail in peel or in shear. Under equal conditions,

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iding good optics and low shrink tension. As polyolefin
h better optics, less shrink tension, and at lower cost,
. Shrink films provide tamper-evident seals on food and

Metallized films in the packaging industry were intro-
. In metallizing (qv), a thin metal vapor layer, usually
n a film surface in a vacuum. The metallizing chamber
ounted and threaded. The chamber is closed and evac-
allized. No adjustments can be made during the process.
um eliminates air pockets. Film uniformity and winding

utstanding to justify process economics.
e the necessary quality for economical metallization. In
ension is high enough to eliminate corona discharge
sion.

n, and polypropylene are also used for metallized pack-
an be laminated with reverse-printed high clarity films
some cases, the metal layer improves barrier properties.
; is a batch process, metallized films are expensive and
rier enhancement is required or the marketing advan-

lethods

n is based on strength (tensile strength, impact strength,
th, and tear strength), transmission properties (perme-
and odors), including light transmission (clarity, haze,
nance (coefficient of friction, blocking, heat sealability,
d crease or flex-crack resistance). Properties of the prin-
iven in Table 3.

Ultimate tensile strength is the maximum tensile stress
n sustain the maximum load exerted on the film during
). Elongation is the measure of ductility of a material
ge of change of the original length of the sample between
achine. Young's modulus, or the modulus of elasticity,
that is required to deform the film to a certain degree,
asure of the intrinsic stiffness of the film. It is the ratio
he range for which the ratio is constant, ie, up to the

rength. Impact strength is the energy required to frac-
bject to shock loading (ASTM D 3420-80) (9). It is a

is a measure of resistance of the film to bending. It
inherent stiffness, and can be measured directly by the
tester. The test measures the force required to push a